

THE HOPPI-COPTER



The Smallest Man-carrying Helicopter in the World : Empty Weight Less than 200 lbs

The Hoppi-Copter all but airborne. Note the "hanging stick" control. On the right, Mr. H. T. Pentecost, the designer, waiting to have the engine started.



AN interesting and welcome visitor to this country is returning to America on Saturday after a few weeks' stay, but he is leaving behind a piece of intriguing mechanism—in fact two—with which British helicopter enthusiasts will have a great deal of fun. The visitor is Mr. Horace T. Pentecost, president of Hoppi-Copters, Inc., of Boeing Field, Seattle, Washington, and he brought over to this country two of his Hoppi-Copters, type 102. Present plans are that one will go to the Research, Development and Training Unit for Rotary Wing Aircraft at Beaulieu, where the O.C., S/L. F. J. Cable, will teach himself to fly it and then make exhaustive tests of its characteristics. Negotiations are also proceeding with a view to forming an English company for the development and manufacture of the Hoppi-Copter.

Mr. Pentecost first conceived the idea of a very small helicopter during the war, and in fact produced a version strapped to the back of the pilot, whose legs were the "undercarriage." The intention was that the contraption should be used for getting individual troops to inaccessible places. The idea was not adopted, but Mr. Pentecost was to some extent rewarded by being awarded the second prize at the World Inventors' Exposition in Los Angeles.

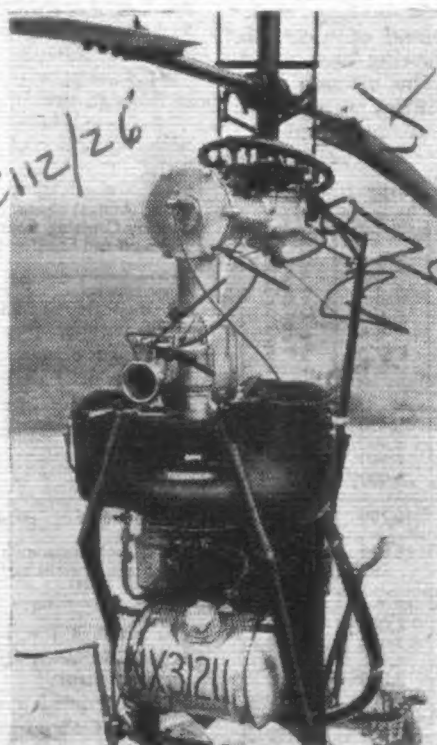
With the coming of peace, Mr. Pentecost realized that something a little more substantial was needed, and after much development work and burning of the midnight oil he has evolved the present model, the Hoppi-Copter 102, which is just about the simplest man-lifting flying machine ever built. Three undercarriage legs, an engine, transmission, superimposed two-bladed contra-rotating rotors, a seat, and a control stick describes the outfit; or nearly so; there is also a rotor revolu-

tion counter, a throttle and a small clutch lever.

It might be argued that there is not much more than that in any helicopter. True, these are bare essentials, but it is in simplifying every one of them that Mr. Pentecost has shown his ingenuity, and he has reduced the flight controls to one: a single "hanging" stick. Movement of the stick in any direction causes the machine to travel in that direction by applying cyclic pitch in the appropriate sector of the rotor disc. Collective pitch increase and decrease is applied to both rotors by raising or lowering the control stick bodily, and directional control by twisting the stick handle. This action applies more or less pitch to the upper rotor only, thus leaving a small unbalanced torque which causes the machine to turn in one direction or the other.

The whole control mechanism is remarkably simple: gimbal rings linked by tubular rods to the pitch cranks of the rotor blades. It is, of course, our old friend the wobble plate reduced to its lightest form. Doing away with a separate collective pitch-control lever has not only avoided the need for that awkward "pat-your-head-and-rub-your-chest" control co-ordination which is so very far from being instinctive, but it has saved both weight and complication. The twist-grip on the stick is geared to a cam ring on the lower control gimbal so that rotation of the grip rotates the ring, and the sloping cam slots cause it to rise or fall, according to the direction of rotation, thus increasing or decreasing the pitch of both blades of the top rotor simultaneously by sliding the upper gimbal ring up and down the rotor shaft.

Simplification, largely made possible by the small size, low weight and small forces involved, has also been intro-



Rear view, showing the two-cylinder engine, petrol tank, transmission and gimbal-ring control mechanism.